NOTES FROM PACIFIC COAST OBSERVATORIES.

Photographic Measures.

Of importance and interest to those engaged in the work of measurement or reduction of photographic plates is a dissertation by Walter Zurhellen, of Bonn University, entitled "Darlegung und Kritik zur Reduction photographischer Himmelsaufnahmen."

The photographic method of investigation has been given a new impetus recently through its application in the determination of the solar parallax and by the completion and distribution of a few volumes of the astrographic catalogue.

The great enthusiasm which appeared when the possibilities of the photographic method began to be realized was dampened by the fact that an excessive amount of time and labor was found to be required not only to prepare for work by adjusting and investigating the errors of the photographic telescope and the measuring apparatus, but to get the photographs, measure the plates, and perform the reductions, after all this preliminary work had been done. The recent tendency has been to reduce the labor involved by the development of special methods suited to the various problems and the construction of tables to facilitate the reduction.

Dr. Zurhellen has given an exposition of the methods in most general use in the reduction of photographic measures. The first section is an introduction in which the coordinate systems most used in the subsequent pages are clearly defined with the help of figures, and algebraic relations are given between the coordinates. The second section is devoted to the formulas used in computing corrections for refraction, aberration, precession, and nutation, and in determining the plate constants with the help of known stars on the plate. The discussion of the refraction formulas is somewhat unsatisfactory, due to the involved nature of the algebraic processes and the difficulty of estimating the relative importance of the terms

which are dropped early in the discussion. The objections urged against the very simple and elegant formulas produced by Professor TURNER (*Monthly Notices,* Vol. LVII, p. 136) do not seem to the writer to be valid. TURNER'S formulas, as given, yield the components of the displacement due to refraction as a function of the true coordinates of the star, the y axis of reference passing through the pole. If the coordinates of the stars and of the center of the plate as affected by refraction be substituted for the corresponding true coordinates and the constant of refraction appropriately modified, the formulas will yield the components of the corrections necessary to remove the effect of refraction from the measured coordinates. Tables to facilitate the application of these formulas have been constructed at this observatory and are to be published in Volume VII of the *Publications of the Lick Observatory.*

The remainder of this section contains a valuable discussion of the other corrections which must be applied in the derivation of ideal coordinates. The discussion of the corrections necessitated by the inclination of the plate to its true position perpendicular to the optic axis will prove especially valuable to those working with lenses covering a field several degrees in diameter. The treatment of Professor TURNER'S six constant method of reduction seems rather severe, particularly the last sentence of the section, which states that the method should be "altogether discarded." The general opinion seems to be that in many cases Professor TURNER'S method is sufficiently accurate and more convenient than any other.

The last section deals with the transformation of ideal coordinates into intervals of Right Ascension and Declination. The matter is handled clearly and concisely and the advantages of the several methods well stated.

The list of books and articles consulted in preparing the dissertation contains the important contributions to the subject.

This dissertation, though it does not claim to contain many new formulas, is a real contribution to the subject, as an intelligent collection and discussion of the most important method now in use. The main obstacle to the more general use of the photographic method is, as stated above, the excessive labor of the measurement and reduction—particularly the latter. The author has recognized that the first step in overcoming this

obstacle is to collect the various methods for a comparative study. B. L. NEWKIRK.

The Students' Observatory has been honored recently by the visits of several men of distinction in the scientific world. Dr. JOHN M. VAN VLECK, Professor of Mathematics and Astronomy in Wesleyan University, of Middletown, Connecticut, spent some days in Berkeley in the latter part of May. Some weeks later we were visited by Dr. OTTO TETENS, who has been engaged for several years in making magnetic observations in Samoa under the auspices of the Royal Academy of Sciences of Göttingen. More recently, the observatory has been favored by visits from Professor E. O. LOVETT, of Princeton University, Mr. DOUGLASS, formerly of the Lowell Observatory, Flagstaff, Arizona, and Professor ROBERT SIMPSON WOODWARD, President of the Carnegie Institution, of Washington. A. O. LEUSCHNER.

OBSERVATIONS OF THE SIXTH SATELLITE OF *JUPITER*.

The sixth satellite of *Jupiter* shows on several plates recently taken with the Crossley reflector. Comparatively rough measures of the plates on the nights of July 25th, 26th, and 27th, with exposures of 30 minutes, 1 hour, and 1½ hours, respectively, gave the following positions for the satellite relative to *Jupiter,* a reversed image of which appears on the plates:—

Date.	Distance.	Position Angle.
July 25.95	25′.1	55°.0
26.97	24 .3	52 .7
27.93	23 .6	50 .7

The parts of the star-trails used in the measures were estimated to correspond to the times given above, and may be in error by about 0.01 of a day. Definitive measures should not change the distances very much, but may change the position-angles by one or two tenths of a degree. These observations show the satellite to be about ten days behind the ephemeris positions which were computed for it by Dr. FRANK E. Ross (*L. O. Bulletin* 78).

The satellite is of about the fourteenth photographic magnitude. S. ALBRECHT.

July 29, 1905.